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RECORDS OF INSTALLATION AND MAINTENANCE OF WATER MAINS AND APPURTENANCES OF THE MU- NICIPAL DISTRIBUTION SYSTEM OF THE CITY OF NEW YORK¹

BY WILLIAM HAUCK

The following is a brief description of the procedure followed and records made, in connection with the installation and maintenance of water mains and appurtenances of the municipal water supply system of the city of New York. This work is under the Bureau of Water Supply of the Department of Water Supply, Gas and Electricity.

Requests for mains are noted on forms provided for that purpose and generally spoken of as project sheets. The outlines of the locations with the existing and proposed mains, etc., are shown in sketches at the top of these sheets and all the data as to requirements and conditions are filled in, using spaces provided for the purpose. Special local information is noted under "remarks." These sheets take a prescribed course and are eventually combined and included in a contract or filed for future reference, depending upon whether they are approved or disapproved. Complete record is kept of these sheets in books provided for that purpose.

When necessity requires it, an order is issued to the Division of Investigation and Design to prepare a contract for laying mains, etc., in certain locations. The plans which were prepared in accordance with the project sheets are then combined and a title page added. The bids for the work are received on the percentage basis, i.e., the contractor is required to bid a percentage of the unit prices fixed by the engineer for each item. The bids are noted for general information on tracings known as "bid sheets," giving the names of the bidders, together with the unit prices estimated and bid. When the stipulated preliminaries are fulfilled the borough engineer is directed to see that the contract is executed. In the case of a furnishing, delivering and laying contract, three copies of a requisi-

¹ Read before the St. Louis Convention, May 16, 1918.

tion covering the material required are prepared; one is sent to the contractor and the other two to the inspection division, which in turn, issues orders to its foundry inspectors to inspect the castings during and after manufacture. Reports of these inspections, in duplicate, giving the numbers and weights of castings (R being used to indicate rejections) are forwarded regularly, one copy being filed in the inspection division and one with the engineer in charge of the contract.

Progress on the contracts is noted on the print or prints kept for that purpose, the pipe, etc., laid being indicated by marking with red crayon. A plan or plans is sent to the foreman in whose district the work is to be done, and he is at the same time informed as to the engineer in charge of the work and from whom he is to take orders as to shut-offs, etc.

Inspectors assigned to the field work keep field books, noting therein daily all work done, force employed and sketches showing details of connections. All numbers and weights of castings received or borrowed from or sent to the department yards are noted in these books and later transcribed on daily report forms provided for this purpose and delivered to the borough headquarters.

The engineers in charge of field work keep records of pipe laid, drawn to scale on cross-sectioned cards, 5 by 8 inches, one card for pipe, castings, etc., and a corresponding card for trench excavations, showing the location of the pipe in relation to the curb, the cover on the pipe, class of excavation, pavement and any other details that are essential in connection with properly preparing the estimate for payment for work done.

A monthly report of the work done is prepared showing the progress, which is also graphically shown by plotting a curve, a required-progress curve having been previously established in accordance with the time allowed for the completion of the contract and estimated cost, etc.

All castings are numbered and weighed at the foundry and these weights and numbers are used for identification of these materials until they are placed in the work or delivered at one of the designated department yards. Loose leaf sheets, 13 by 16 inches, are used for keeping records of cast iron material and, also, for working out from the field sheets the remaining items of the contract. The ruling is the only difference in these sheets. The casting sheets are ruled vertically and horizontally and rubber stamps are used to

designate various materials. The remaining items are figured on sheets ruled horizontally only, no rubber stamps being used.

Approximate estimates of work done are prepared from time to time, but not oftener than once a month, and are forwarded on sheets especially prepared for the purpose.

Notes on pipe, etc., installed are copied by the draftsmen on a map, on a scale of 1 inch to 300 feet (known as the wall map), on 27 by 40-inch tracing maps having an approximate scale of 1 inch to 100 feet and in turn copied on field and headquarters maps of emergency engineers, on maps of the Water Waste Investigation force, the maps used by all foremen, and also on the maps which are carried on each repair vehicle.

When all of the work on a contract has been completed, accurate drawings, on a scale of 1 inch to 40 feet, are prepared as a permanent record.

The city is divided into repair districts, the size of the district depending on the maintenance involved. The clerk in each headquarters sends daily to the borough main office a copy of his blotter. Every individual piece of work done by the repair company force is designated by a job number. Weekly he sends a report of work done that affects the maps. This is checked with his daily reports, and maps and records corrected accordingly. In addition to the blotter the clerk keeps a book, known as the complaint record, in which complaints are recorded, the final disposition being noted.

The records of taps inserted and also plugs used to replace taps are kept on $3\frac{3}{4}$ by 6-inch cards; all details as to the location with reference to curb and house lines, size of the mains, depth of cover on the main, plumber's name, tapper's name, etc., are noted. The same cards are used to record the house service inspections.

A staff of draftsmen and clerks is continually employed in keeping up to date the numerous maps and various office records. The district companies are visited regularly by a junior draftsman in order to keep the maps up to date within a week. The office maps are kept up to date daily.